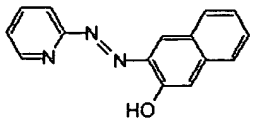
L Number	Hits	Search Text	DB	Time stamp
1	1	("5985540").PN.	USPAT	2003/10/11 18:35
2	5	("4940658" | "5438017" | "5478729" | "5631127" | "5827645").PN.	USPAT	2003/10/11 17:44
3	6	5985540.URPN.	USPAT	2003/10/11 17:47
5	0	((sulfide or sulfur) adj3 (determine or determination or calculate or calculation or measure or measurement or quantify or quantification)) and enzyme	EPO; JPO; DERWENT	2003/10/11 18:37
6	0	((sulfide or sulfur) adj3 (determine or determination or calculate or calculation or measure or measurement or quantify or quantification)) and lyase	EPO; JPO; DERWENT	2003/10/11 18:37
7	2	((sulfide or sulfur) adj3 (determine or determination or calculate or calculation or measure or measurement or quantify or quantification)) and (iron or zinc)	EPO; JPO; DERWENT	2003/10/11 18:38
8	0	((sulfide or sulfur) adj3 (determine or determination or calculate or calculation or measure or measurement or quantify or quantification)) and (nitroso or nitrosoaminophenol or pyridylazo)	EPO; JPO; DERWENT	2003/10/11 18:38
9	0	((sulfide or sulfur) adj3 (determine or determination or calculate or calculation or measure or measurement or quantify or quantification)) and (color or chromophore)	EPO; JPO; DERWENT	2003/10/11 18:39
4	28	(sulfide or sulfur) adj3 (determine or determination or calculate or calculation or measure or measurement or quantify or quantification)	EPO; JPO; DERWENT	2003/10/11 18:39

1-(2-Pyridylazo)-2-naphthol

[85-85-8]



C15H11N3O = 249.27

Unit	Product code
1 g	
5 g	P002
10 g	

Appearance : orange yellow or orange red crystals
Absorbance : > 0.60 (around 470nm)
m.p. : 138 - 140 °C
Sulfated ash : < 1 %

|Storage| |Applications| |Specifications| |MSDS| |FAQ| |NMR| | IR |

PAN is a metal indicator as well as a photometric reagent for heavy metal ions and rare earth metal ions. This reagent is slightly soluble in acidic solutions, and soluble in alkaline solutions. Proton dissociation constants are reported to be pK_{a1} = 2.9 and pK_{a2} = 11.6(μ = 0.1, $NaClO_4$, at room temperature). The aqueous solution is yellow below pH 12 and red above 12. Distribution coefficients of chloroform/water and carbon tetrachloride/water are reported to be log K_D = 5.4 and log K_D = 4.0, respectively. **PAN** is applicable to determine Sc[*Bull. Chem. Soc. Jpn*, **59**,1962(1986)].

Table 2-2-9 Formation constant of metal-PAN chelate(at 25 °C)

Metal	$logK_{ML}$	$logK_{ML_2}$	Conditions
Cu(II)	>12		50 % of Dixane
Cu(II)	15.6	8.4	50 % of Dixane
Mn(II)	8.5	7.9	50 % of Dixane
Ni	12.7	12.6	50 % of Dixane
Zn	11.2	10.2	50 % of Dixane
Al	12.9		50 % of ethanol
Ga	15.1		50 % of ethanol
In	13.1		50 % of ethanol
Eu	12.3	11.4	μ = 0.05, ClO_4^-
	$logK_{ML_3}$ = 10.4	$logK_{ML_4}$ = 9.5	

Table 2-2-10 Conditions of photometric determination using PAN

Metal	Conditions	λ_{max} (nm)	ε (x 10^4)	Extraction solvent	Range (ppm)
Cd	pH 8.7 - 10	555	4.9	chloroform	~ 2.5
Hf	pH 4, 40% of methanol	545	3.9	H2O	0.2 -3.6
Mn(II)	pH 8.8-9.6, NH_3, KCN	562	4.8	chloroform	0.2 - 1.2
Ni	pH 3.5 - 5.2	570	5	benzene	~1.5
Os(VIII)	pH 8.0 - 9.5, Triton-100	550	2.8	chloroform	~ 9.2
Zn	pH 8 - 9.5	555	5.6	H2O	0.2 - 2
rare earth metal		530	6 - 7	chloroform	~ 2

Applications in :

Chelating titration : Bi, Cd, Ce, Cu, Ga, In,
Extraction photometry : Ag, Bi, Cd, Co, Cr, Cu,

References

1. S. Shibata, "2-Pyridylazo Compounds in Analytical Chemistry.", Ed. by H. A. Flaschka and A. J. Barnard, Jr., "Chelates in Analytical Chemistry", IV, *Marcel Dekker, Inc.*, NY(1972).

CORPORATE SOURCE: Dept. of Chemical Engineering, GDUT, Canton, 510090, Peop. Rep. China
SOURCE: Guangdong Gongye Daxue Xuebao (1997), 14(Suppl.), 24-26
CODEN: GDAXFR; ISSN: 1007-7162
PUBLISHER: Guangdong Gongye Daxue
DOCUMENT TYPE: Journal
LANGUAGE: Chinese
ABSTRACT:
The color of Ag(I)-5-Br-PADAP (2-(5-bromo-2-**pyridylazo**)-5-diethylaminophenol) complex is faded by **sulfide** in a NaOAc-HOAc buffer soln. (pH 5.3-6.6) in the presence of Na dodecyl sulfate. The apparent molar absorptivity of the complex was 1.2 .times. 105 L mol-1 cm-1, and the degree of decoloring of the complex was proportional to the concn. of ***sulfide*** at 0-5 .mu.g/25 mL. The proposed method was applied to the detn. of **sulfide** in wastewater with satisfactory results.

L3 ANSWER 5 OF 16 CAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1985:178288 CAPLUS
DOCUMENT NUMBER: 102:178288
TITLE: 1-(2-**Pyridylazo**)-2-naphthol as an agent for the determination of cyanide and **sulfide**
AUTHOR(S): Snyder, William Dean
CORPORATE SOURCE: Georgia Inst. Technol., Atlanta, GA, USA
SOURCE: (1984) 138 pp. Avail.: Univ. Microfilms Int., Order No. DA8425414
From: Diss. Abstr. Int. B 1985, 45(8), 2536
DOCUMENT TYPE: Dissertation
LANGUAGE: English
ABSTRACT: Unavailable

=> log y

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NEWS  6  AUG 18  Data available for download as a PDF in RDISCLOSURE
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=> s (sulfide or thiol or sulfur) (3w) (determin? or quantif? or calculat? or
measure?)
         16393 SULFIDE
          2016 SULFIDES
         17684 SULFIDE
                 (SULFIDE OR SULFIDES)
         18356 THIOL
          5677 THIOLS
         21588 THIOL
                 (THIOL OR THIOLS)
         53304 SULFUR
```

```
          103 SULFURS
        53350 SULFUR
                (SULFUR OR SULFURS)
      1350699 DETERMIN?
       106221 QUANTIF?
       234383 CALCULAT?
      1050010 MEASURE?
L1        943 (SULFIDE OR THIOL OR SULFUR) (3W) (DETERMIN? OR QUANTIF? OR
              CALCULAT? OR MEASURE?)

=> s l1 and (enzyme or enzymatic or lyase)
       580871 ENZYME
       214161 ENZYMES
       709067 ENZYME
                (ENZYME OR ENZYMES)
        93199 ENZYMATIC
           20 ENZYMATICS
        93213 ENZYMATIC
                (ENZYMATIC OR ENZYMATICS)
        12571 LYASE
          817 LYASES
        12894 LYASE
                (LYASE OR LYASES)
L2        103 L1 AND (ENZYME OR ENZYMATIC OR LYASE)

=> s l2 and (zinc or iron)
        86902 ZINC
           13 ZINCS
        86903 ZINC
                (ZINC OR ZINCS)
       107988 IRON
          174 IRONS
       108055 IRON
                (IRON OR IRONS)
L3         13 L2 AND (ZINC OR IRON)

=> d l3 1-13 kwic

L3   ANSWER 1 OF 13  BIOSIS  COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI   Quantitative amino acid analysis of bovine NADH:ubiquinone oxidoreductase
     (Complex I) and related enzymes. Consequences for the number of
     prosthetic groups.
AB   Bovine-heart NADH:ubiquinone oxidoreductase (EC 1.6.5.3; Complex I) is the
     first and most complicated enzyme in the mitochondrial
     respiratory chain. Biochemistry textbooks and virtually all literature on
     this enzyme state that it contains one FMN and at least four
     iron-sulfur clusters. We show here that this statement is
     incorrect as it is based on erroneous protein determinations. Quantitative
     amino acid.  .  .  be at least 1.3-1.4 mol FMN/mol Complex I. The spin
     concentration of the electron paramagnetic resonance (EPR) signal ascribed
     to iron-sulfur cluster N2 was determined and
     accounted for 1.3-1.6 clusters per molecule of Complex I. These results
     experimentally confirm the hypothesis (FEBS Lett. 485 (2000).  .  .
     concentration of the EPR signal of the (2Fe-2S) cluster shows that this
     hydrogenase also contains two FMN roups. A third enzyme (Ech),
     the membrane-bound (NiFe)-hydrogenase from Methanosarcina barkeri which
     shows an even stronger evolutionary relationship with Complex I, behaves
     rather normal.  .  .
IT   .  .  .
Parts, Structures, & Systems of Organisms
        heart: circulatory system; mitochondria
IT   Chemicals & Biochemicals
        NADH-ubiquinone oxidoreductase [EC 1.6.5.3, complex I]; enzymes
```

; **iron**-sulfur cluster; prosthetic groups

L3 ANSWER 2 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI The presence of an **iron**-sulfur cluster in adenosine 5'-phosphosulfate reductase separates organisms utilizing adenosine 5'-phosphosulfate and phosphoadenosine 5'-phosphosulfate for sulfate assimilation.
AB. . . phototrophic bacteria use adenosine 5'-phosphosulfate (APS) for assimilatory sulfate reduction, whereas bacteria and fungi use phosphoadenosine 5'-phosphosulfate (PAPS). The corresponding **enzymes**, APS and PAPS reductase, share 25-30% identical amino acids. Phylogenetic analysis of APS and PAPS reductase amino acid sequences from. . . sequences of the APS reductase cluster contained two additional cysteine pairs homologous to the cysteine residues involved in binding an **iron**-sulfur cluster in plants. Moessbauer analysis revealed that the recombinant APS reductase from Pseudomonas aeruginosa contains a (4Fe-4S) cluster with the same characteristics as the plant **enzyme**. We conclude, therefore, that the presence of an **iron-sulfur** cluster **determines** the APS specificity of the sulfate-reducing **enzymes** and thus separates the APS- and PAPS-dependent assimilatory sulfate reduction pathways.
IT Major Concepts
Enzymology (Biochemistry and Molecular Biophysics); Metabolism; Methods and Techniques
IT Chemicals & Biochemicals
adenosine 5'-phosphosulfate; adenosine 5'-phosphosulfate reductase **iron**-sulfur cluster; phosphoadenosine 5'-phosphosulfate

L3 ANSWER 3 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI Evaluation of the protein concentration in **enzymes** via determination of sulfur by total reflection X-ray fluorescence spectrometry: Limitations of the method.
AB. . . Total reflection X-ray fluorescence spectrometry (TXRF) offers many advantages for the identification of trace elements in biological samples like proteins, **enzymes**, tissues or plants. Because of difficult and time consuming isolations and cleaning procedures **enzyme** samples are often available in small amounts only. Using TXRF without any preliminary treatment, a 'screening' of such samples to. . . Mo and the alkaline earth metal Ca may be determined with high accuracy. A further aspect of the investigation of **enzymes** is the simple and simultaneous determination of light elements. Sulfur, especially, is of interest. This element is a component of two amino acids, methionine and cysteine, and of **iron**-sulfur clusters and may be used for easy and simultaneous calculation of the protein concentration. Hence quantitative determination of sulfur by. . . cross-check regarding of conventional quantitative determination of protein concentration by, e.g. the Lowry method. On the basis of two selected **enzymes** of different origins and molecular weights this paper will demonstrate the influence of bio-organic matrix and different buffer media on **sulfur determination** by TXRF. The influence of layer thicknesses of the dry residues and absorption or scattering effects will be discussed. The results indicate that in **enzymes** with low molecular weights and minor amounts of buffer components a reliable determination of sulfur is possible. By contrast, for **enzymes** stored in higher buffer concentrations poorer results are given on account of the matrix effects described.
IT Major Concepts
Enzymology (Biochemistry and Molecular Biophysics); Methods and Techniques
IT Chemicals & Biochemicals
NADH-Q oxidoreductase; calcium; copper; diisopropylfluorophosphatase; **iron**; molybdenum; nickel; **sulfur**: **determination**

RN 7440-70-2 (CALCIUM)
7440-50-8 (COPPER)
9032-18-2 (DIISOPROPYLFLUOROPHOSPHATASE)
7439-89-6 (**IRON**)
7439-98-7 (MOLYBDENUM)
7440-02-0 (NICKEL)
7704-34-9 (SULFUR)

L3 ANSWER 4 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI Mutations in the tether region of the **iron**-sulfur protein affect the activity and assembly of the cytochrome bc1 complex of yeast mitochondria.
AB. . . Resolution of the crystal structure of the mitochondrial cytochrome bc1 complex has indicated that the extra-membranous extrinsic domain of the **iron**-sulfur protein containing the 2Fe2S cluster is connected by a tether to the transmembrane helix that anchors the **iron**-sulfur protein to the complex. To investigate the role of this tether in the cytochrome bc1 complex, we have mutated the. . . Ala-86, Ala-90, Ala-92, Lys-93 and Glu-95 and constructed deletion mutants DELTAVLA(88-90) and DELTAAMA(90-92) and an insertion mutant I87AAA88 in the **iron**-sulfur protein of the yeast, Saccharomyces cerevisiae. In cells grown at 30degreeC, **enzymatic** activities of the bc1 complex were reduced 22-56% in mutants A86L, A90I, A92C, A92R and E95R, and the deletion mutants,. . . while activity of the insertion mutant was reduced 90%. No loss of cytochromes b or c-c1, detected spectrally, or the **iron-sulfur** protein, **determined** by quantitative immunoblotting, was observed in these mutants with the exception of the mutants of Ala-92 in which the loss of activity paralleled a loss in the amount of the **iron**-sulfur protein. EPR spectroscopy revealed no changes in the **iron**-sulfur cluster of mutants A86L, A90I, A90I, A92R or the deletion mutant DELTAVLA(88-90). Greater losses of both protein and activity were. . . in A90F grown at 37degreeC. suggesting that these conserved alanine residues may be involved in maintaining the stability of the **iron**-sulfur protein and its assembly into the bc1 complex. By contrast, no significant loss of **iron**-sulfur protein was observed in the mutants of Ala-86 in cells grown at either 30degreeC or 37degreeC despite the 50-70degree loss of **enzymatic** activity suggesting that Ala-86 may play a critical role in catalysis in the bc1 complex.
IT . . .
conserved amino acid residue; Glu-95: conserved amino acid residue; Lys-93: conserved amino acid residue; cytochrome bc-1 complex: crystal structure, mitochondrial; **iron**-sulfur protein: extrinsic domain, tether region

L3 ANSWER 5 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
AB Total Reflection X-Ray Fluorescence Spectrometry (TXRF) offers many advantages for the detection of trace elements in **enzymes** as compared to other well known analytical techniques like flame-AAS or ICP-AES because of the significantly smaller amounts of sample. . . Mn and Mo could be determined with high accuracy, in spite of the large bio-organic matrix. Besides the metals also **sulfur** can be **determined** in protein samples. The two terminal oxidases, cytochrome c oxidase and quinol oxidase, isolated from the soil bacterium Paracoccus denitrificans,. . . values. The investigations lead to the conclusion that the method is well suited for the quantitative determination of metals in **enzymes**, and in particular their molar ratios, and requires only small amounts of the biological sample without any extensive pretreatment.
IT Major Concepts
Biochemistry and Molecular Biophysics; Methods and Techniques
IT Chemicals & Biochemicals
copper: analysis, determination, assay; cytochrome c; **enzymes**

: analysis; **iron**: analysis, assay, determination; manganese: analysis, assay, determination; metal cofactors: analysis, assay, determination; metals: analysis, assay, determination; molybdenum: analysis, determination, assay; nickel: analysis, assay, determination; oxidases; quinol oxidase; respiratory chain complexes: analysis; trace elements: analysis, determination, assay; **zinc**: analysis, determination, assay

RN 7439-89-6 (**IRON**)
7440-02-0 (NICKEL)
7440-50-8 (COPPER)
7440-66-6 (**ZINC**)
7439-96-5 (MANGANESE)
7439-98-7 (MOLYBDENUM)
9035-73-8D (OXIDASES)
9007-43-6 (CYTOCHROME C)

L3 ANSWER 6 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN

TI Matrix-assisted laser desorption/ionization mass spectrometry analysis and **thiol**-group **determination** of isoforms of bovine cytochrome c oxidase, a hydrophobic multisubunit membrane protein.

AB. . . sequencing. For the investigation of the cysteine status 7-diethyl-amino-3-(4'-maleimidylphenyl)-4-methylcoumarin proved to be an excellent site-specific reagent. MALDI-MS with the SH-reacted **enzyme** indicates disulfide bridges only in subunit VII and a distorted tetrahedral S coordination of the **zinc** in subunit VI.

IT Major Concepts
Enzymology (Biochemistry and Molecular Biophysics); Methods and Techniques

IT Chemicals & Biochemicals
cytochrome c oxidase: **thiol**-group isoform **determination**; hydrophobic multisubunit membrane proteins; peptides; **zinc**; DNA

RN 9001-16-5 (CYTOCHROME C OXIDASE)
7440-66-6 (**ZINC**)
16734-12-6 (DISULFIDE)

L3 ANSWER 7 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN

TI **Iron** is required to relieve inhibitory effects of NifL on transcriptional activation by NifA in Klebsiella pneumoniae.

AB. . . aerobic conditions or in the presence of combined nitrogen. In contrast to a previous report, we show that depletion of **iron** (Fe) from the growth medium with the chelating agent o-phenanthroline (20 mu-M) mimics aerobiosis or combined nitrogen in giving rise. . . NifL in vivo. Despite the Fe requirement in vivo, we have found no evidence that NifL contains Fe or an **iron-sulfur** (Fe-S) cluster. **Determination** of the molecular mass of an inhibitory form of NifL overproduced under aerobic conditions indicated that it was not posttranslationally. . . NifL inhibition under aerobic conditions, and attempts to relieve NifL inhibition in vitro by reconstituting Fe-S clusters with the NifS **enzyme** (Azotobacter vinelandii) were unsuccessful. Since we obtained no evidence that Fe acts directly on NifL or NifA, we postulate that. . .

IT Major Concepts
Biochemistry and Molecular Biophysics; Genetics; Metabolism; Molecular Genetics (Biochemistry and Molecular Biophysics); Physiology

IT Chemicals & Biochemicals
IRON; NITROGEN

IT Miscellaneous Descriptors
ANAEROBIC NITROGEN-LIMITING CONDITIONS; GENE PRODUCT NIFA; GENE PRODUCT NIFL; GENE REGULATION; **IRON**; MOLECULAR GENETICS; NIFLA OPERON; TRANSCRIPTIONAL ACTIVATION

RN 7439-89-6 (**IRON**)
7727-37-9 (NITROGEN)

L3 ANSWER 8 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
AB. . . water, and soil and sediment extracts using submitochondrial particles (SMP) has been developed. The assay utilizes the mitochondrial electron transfer **enzyme** complex, present in all eukaryotic cells. Prior developmental work with pure chemicals chosen from the U.S. Environmental Protection Agency's (EPA). . . electron transfer protocol and the whole-organism assay, and between the responses of the SMP electron transfer protocol and levels of **zinc** and **sulfur** , as **determined** by inductively coupled plasma spectroscopy.

L3 ANSWER 9 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI On the **iron**-sulfur cluster of adenosine phosphosulfate reductase from Desulfovibrio vulgaris (Hildenborough.
AB. . . multimer is formed, which reversibly changes into smaller units upon addition of salt. The smallest catalytically active unit of the **enzyme** has a molecular-mass of 186 kDa, as determined by gel-filtration chromatography and, therefore, an alpha-2-beta-2 stoichiometry is proposed. The protein was found to contain 5.6 +- 1.1 **iron** and 4.4 +- 0.6 acid-labile sulfur atoms/alpha-beta heterodimer. The reduced protein exhibits a single, rhombic S = 1/2 signal with. . . at low or at high ionic strength never resulted in more than 1 spin/alpha-beta heterodimer. Hence, it follows that the **iron** and sulfur atoms are arranged in one single cluster. The reduction potential of the **iron sulfur** cluster, **measured** in an EPR-monitored redox titration, was found to be -19 mV versus the normal hydrogen electrode (NHE) at pH 7.5.. . . flavin behaves as a two-electron-transferring group; no evidence was obtained for a stabilization of the intermediate semiquinone state in the **enzyme** . Determination of the kinetic parameters of adenosine 5'-phosphosulfate (AdoPSO-4) reductase for its substrates resulted in K-m values for sulfite and. . . mu-M and 50 mu-M, respectively. It is proposed that AdoPSO, reductase contains a single novel Fe/S structure, possibly with an **iron**-nuclearity greater than four.
IT Major Concepts
Enzymology (Biochemistry and Molecular Biophysics); Infection; Physiology
IT Chemicals & Biochemicals
IRON; SULFUR; ADENOSINE PHOSPHOSULFATE REDUCTASE; HYDROGEN
RN 7439-89-6 (**IRON**)
7704-34-9 (SULFUR)
9027-75-2 (ADENOSINE PHOSPHOSULFATE REDUCTASE)
1333-74-0 (HYDROGEN)

L3 ANSWER 10 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI LOCALIZATION OF CHROMATOPHORE PROTEINS OF RHODOBACTER-SPHAEROIDES II. TOPOGRAPHY OF CYTOCHROME C-1 AND THE RIESKE **IRON SULFUR** PROTEIN AS **DETERMINED** BY PROTEOLYTIC DIGESTION OF THE OUTER AND LUMINAL MEMBRANE SURFACES.
AB. . . Exclusive and controlled digestion of the chromatophore interior was achieved after Ca2+-induced fusion with large unilamellar phosphatidylglycerol liposomes containing microencapsulated **enzyme** . Reaction center subunit H, which served as a marker for the outer surface, was degraded to a slightly smaller product. . . faces the periplasmic side of the membrane. Although current functional models for the cytochrome bc1 complex predict that the Rieske **iron**-sulfur center interacts with cytochrome c1 in the periplasm, the **iron** -sulfur protein resisted proteolytic attack in the liposome-chromatophore fusion products under conditions that caused extensive degradation of cytochrome c1. Twwo cleavage products of the **iron**-sulfur protein were observed after the digestion of chromatophores, suggesting both a heterogeneity in the population of this protein and the. . .
IT Miscellaneous Descriptors

PROTEINASE K PERIPLASMIC MEMBRANE **ENZYMATIC** METHOD

RN 7439-89-6 (**IRON**)
7704-34-9 (SULFUR)
9035-42-1 (CYTOCHROME C-1)
39450-01-6 (PROTEINASE K)

L3 ANSWER 11 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI LIPOXYGENASE ISOENZYMES A SPECTROSCOPIC AND STRUCTURAL CHARACTERIZATION OF SOYBEAN SEED **ENZYMES**.
AB. . . a detailed physical and structural characterization. Four seed isoenzymes from two soybean cultivars have been studied by peptide mapping, free **thiol** and **iron** content **determinations**, and C-terminal analysis as well as by uv-visible absorption and EPR spectroscopy. While differences between the type 1 **enzyme** and the other isoenzymes were readily detected using proteolytic peptide mapping, digestion with dilute hydrochloric acid and C-terminal analysis both. . . native isoenzyme was consistent with expectations for the experimental aromatic amino acid content. All of the isoenzymes contained one non-heme **iron** atom per molecule of protein. The oxidation of each isoenzyme with product hydroperoxide resulted in the conversion of the **iron** from an EPR silent state into several forms with EPR signals characteristic of high spin **iron**(III). The EPR spectra of all isoenzymes were remarkably similar. A time course EPR and catalytic activity study revealed that the various EPR active states represent a complex equilibrium between **iron** atoms in different environments. The pH dependence for the EPR and absorption spectroscopy lends support to the hypothesis that acid/base. . .

L3 ANSWER 12 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
AB Redox titrations of the fructose-specific carrier protein, .**GRAPHIC**. in Rhodopseudomonas sphaeroides show that only the reduced form of the **enzyme** is active. The oxidized form of the **enzyme** can still be phosphorylated but is unable to transfer the phosphoryl group to fructose. The redox properties of the **enzyme** change upon phosphorylation. The reduction rate of .**GRAPHIC**. is slower than that of .**GRAPHIC**. whereas the opposite is true for. . . the redox centre is more negative on .**GRAPHIC**. than .**GRAPHIC**. most likely due to an upwards pK shift of the **thiols** upon phosphorylation. The **measurements** indicate that the phosphotransferase system is regulated by the redox potential in a way that is dependent on the substrate. . .
IT Miscellaneous Descriptors
ELECTRON TRANSPORT **ZINC**
RN 73-89-2 (PHOSPHOENOLPYRUVATE)
7440-66-6 (**ZINC**)
9031-09-8 (PHOSPHOTRANSFERASE)
57-48-7Q, 30237-26-4Q (FRUCTOSE)

L3 ANSWER 13 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI MURINE CYTOTOXIC ACTIVATED MACROPHAGES INHIBIT ACONITASE IN TUMOR CELLS INHIBITION INVOLVES THE **IRON**-SULFUR PROSTHETIC GROUP AND IS REVERSIBLE.
AB. . . Previous studies show that cytotoxic activated macrophages cause inhibition of DNA synthesis, inhibition of mitochondrial respiration, and loss of intracellular **iron** from tumor cells. Here we examine aconitase, a citric acid cycle **enzyme** with a catalytically active **iron-sulfur** cluster, to **determine** if **iron**-sulfur clusters are targets for activated macrophage-induced **iron** removal. Results show that aconitase activity declines dramatically in target cells after 4 h of co-cultivation with activated macrophages. Aconitase. . . ferrous ion plus a reducing agent causes near-complete reconstitution of aconitase activity. The results show that

removal of a labile **iron** atom from the [4Fe-4S]cluster, by a cytotoxic activated macrophage-mediated mechanism, is causally related to aconitase inhibition.

```
=> s l2 and (homocysteine)
          7988 HOMOCYSTEINE
            10 HOMOCYSTEINES
          7992 HOMOCYSTEINE
                 (HOMOCYSTEINE OR HOMOCYSTEINES)
L4           0 L2 AND (HOMOCYSTEINE)

=> s l2 and (pyridylazo or nitrosoaminophenol or nitroso?)
           257 PYRIDYLAZO
             1 NITROSOAMINOPHENOL
         30356 NITROSO?
L5           5 L2 AND (PYRIDYLAZO OR NITROSOAMINOPHENOL OR NITROSO?)

=> d l5 kwic 1-5
```

L5 ANSWER 1 OF 5 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN

TI Characterization of cytochrome P450 2E1 activity by the (14C) **nitrosodimethylamine** breath test.

AB The objective of this study was to measure the rate of demethylation of **nitrosodimethylamine** in vivo in the rat and determine its value to assess CYP2E1 activity in intact animals. **Nitrosodimethylamine** labeled with 14C on both methyl groups was administered to rats and exhaled 14CO2 was collected during 2-3 h. The **nitrosodimethylamine** breath test was increased by inducers of CYP2E1, such as ethanol (+139%) and 4-methylpyrazole (+115%). and decreased by the inhibitor diallyl sulfide (-53%). In addition, the **nitrosodimethylamine** breath test was not changed significantly by inducers specific for other cytochrome P450 such as beta-naphthoflavone, dexamethasone, and phenobarbital. The specificity of the induction by 4-methylpyrazole and of the inhibition by diallyl **sulfide** for CYP2E1 was **determined** using the (14C)caffeine (CYP1A2), (14C)aminopyrine (CYP2C11), and (14C)erythromycin (CYP3A2) breath tests. 4-Methylpyrazole treatment caused a small increase of the caffeine. . . of the aminopyrine breath test (-13%) but a 23% increase of the erythromycin breath test. It is concluded that the (14C)**nitrosodimethylamine** breath test is useful to assess CYP2E1 activity in vivo in the rat.

IT Methods & Equipment

[carbon-13]**nitrosodimethylamine** breath test: analytical method, catalytical activity evaluation method, **enzymatic** method, physiological method

L5 ANSWER 2 OF 5 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN

TI A method to study kinetics of transnitrosation with **nitrosoglutathione**: Reactions with hemoglobin and other thiols.

AB The rate of protein S-nitrosylation, a reversible process by which S-**nitroso** thiol (RS-NO) com. pounds exchange the NO+ moiety with protein SH groups, is essentially governed by two factors, the pKa. . . formation (RSH + GS-NO fwdarw RS-NO + GSH) can be monitored by spectrophotometry at 340 nm in terms of the **enzymatic** conversion of GSH to a GS conjugate. Unlike methods based on NO release from the S-NO bond, this procedure is. . . of thiols. The second order rate constants of S-nitrosylation of human and rat oxy- and deoxyhemoglobin of BSA and other **thiols** were **calculated** by this method which confirmed previous results reported in the literature.

IT Major Concepts

Biochemistry and Molecular Biophysics; Methods and Techniques

IT Chemicals & Biochemicals

hemoglobin: transnitrosation kinetics; **nitrosoglutathione**:

nitrosylating agent; proteins: transnitrosation kinetics; thiols: transnitrosation kinetics

L5 ANSWER 3 OF 5 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
AB. . . study investigates the effects of thiol-depleting/modifying agents on the activity of and tolerance to nitroglycerin (GTN), sodium nitroprusside (SNP) and S-**nitroso**-Nacetylpenicillamine (SNAP) in an in vivo rat model. Rats were treated with either vehicle (control), GTN (before and after induction of. . . SNP and SNAP on vascular cyclic GMP levels were investigated before and after each treatment. In addition, plasma and tissue **thiol** concentrations were **measured** in the same tissues as used for the determination of cyclic GMP in aorta and inferior vena cava after single. . . action and tolerance. Here we propose that SNAP may act either directly by nitrosation of the heme moiety of the **enzyme** or via an S-**enzyme**-S-drug transnitrosation reaction, whereas GTN and SNP actions are mediated by the formation of S-**nitrosothiol** on the **enzyme** itself, rather than by activation of the **enzyme** by free S-**nitrosothiols**.

L5 ANSWER 4 OF 5 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
AB. . . this report, we demonstrated that the Yersinia protein tyrosine phosphatase (PTPase) could be inactivated by the alkylating agent iodoacetate. The **enzyme** modification was selective, and the covalent attachment was stoichiometric. The residue that was labeled by iodoacetate was shown to be. . . ionic strength of the media increased. There was no significant D-20 solvent isotope effect associated with the inactivation of the **enzyme**, suggesting that thiol anion of Cys403 reacted as a nucleophile. The Yersinia PTPase also displayed differential reactivity (940-fold) toward iodoacetate over iodoacetamide. This indicates that residues within the active site of the **enzyme** are positively charged. The pK-a of the active site **thiol** group was **determined** to be 4.67. The low pK-a value suggests that ionic interactions are important in stabilizing the thiolate anion. One candidate. . . thiol in the mutants also showed enhanced reactivity toward iodoacetate. The second-order rate constants for the inactivation of the wild-type **enzyme**, H402N, and H402A were 59.7, 3305, and 1763 M-1 min-1, respectively.
ORGN Super Taxa
Enterobacteriaceae: Eubacteria, Bacteria; Nitrobacteraceae: Eubacteria, Bacteria
ORGN Organism Name
Enterobacteriaceae (Enterobacteriaceae); **Nitrosomonas** (Nitrobacteraceae)
ORGN Organism Superterms
bacteria; eubacteria; microorganisms

L5 ANSWER 5 OF 5 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI DIFFERENTIAL EFFECTS OF THIOLS ON DNA MODIFICATIONS VIA ALKYLATION AND MICHAEL ADDITION BY ALPHA ACETOXY-N-**NITROSOPYRROLIDINE**.
AB The hepatocarcinogen NPYR is metabolically activated by .alpha.-hydroxylation mediated by cytochrome P-450 **enzymes** to yield a 4-oxobutylating agent and 2-butenal (crotonaldehyde). Both are reactive intermediates capable of modifying DNA with guanine either by. . . formation of adduct 2, although both adducts are presumably derived from the 4-oxobutylating agent. The reaction rates of thiols with **crotonaldehyde** were determined to **be** in following order: means > Glu > Nac. These results indicate that the differential effects of thiols on DNA modification. . .

=> s l1 and (pyridylazo or nitrosoaminophenol or nitroso?)
257 PYRIDYLAZO

```
             1 NITROSOAMINOPHENOL
         30356 NITROSO?
L6          13 L1 AND (PYRIDYLAZO OR NITROSOAMINOPHENOL OR NITROSO?)

=> d l6 kwic 1-13
```

L6 ANSWER 1 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI Plasma cysteine deficiency and decreased reduction of **nitrososulfamethoxazole** with HIV infection.
AB. . . deficiency and whether this is associated with decreased detoxification of the toxic metabolites of sulfamethoxazole. Reduced, oxidized, protein-bound, and total **thiol** levels were **measured** in 33 HIV-positive patients and 33 control subjects by an HPLC method utilizing the fluorescent probe bromobimane. The reduction of sulfamethoxazole hydroxylamine and **nitrososulfamethoxazole** by plasma and the plasma redox balance in the presence of **nitrososulphamethoxazole** were also determined by HPLC. Reduced plasma cysteine was significantly ($p < 0.0001$) lower in HIV-positive patients (13.0 +- 3.0. . . were lower in HIV-positive patients. Reduced homocysteine was elevated in patients. Plasma from HIV-positive patients was less able to detoxify **nitrososulfamethoxazole** than control plasma. These findings show that the disturbance in redox balance in HIV-positive patients may alter metabolic detoxification capacity,. . .

L6 ANSWER 2 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI Glutathione modulation changes the penetration of N-(3H)methyl-N-nitro-N-**nitrosoguanidine** into gastric mucosa of rats.
AB. . . the glutathione level is elevated in some forms of gastritis. We studied the relevance of glutathione for the penetration of N-methyl-N-nitro-N-**nitrosoguanidine** in the glandular mucosa of the stomach. Male Wistar rats were treated with glutathione (0.5 mmol/kg intravenously), N-acetylcysteine (0.5 mmol/kg intravenously), or L-buthionine-(S,R,)-sulfoximine (BSO, 2 mmol/kg intraperitonealy), before the gastric mucosa was exposed to N-(3H)methyl-N-nitro-N-**nitrosoguanidine** for 10 min. Penetration of the carcinogen was evaluated by light microscopic identification of cells labeled with bromodeoxyuridine and N-(3H)methyl-N-nitro-N-**nitrosoguanidine** (double-labeled cells). **Thiol** substances were **quantified** by reversed-phase ion-pair liquid chromatography and fluorescence detection. The percentage double-labeled cells was higher in antrum mucosa (11.7 +- 3.1%). . . = 0.002), and the amount of reduced glutathione ($r = 0.449$, $P = 0.002$). Glutathione modulation effects the penetration of N-(3H)methyl-N-nitro-N-**nitrosoguanidine** in the antrum but not in the corpus mucosa. Thiols do not explain the different penetration of carcinogen in antrum. . .
IT . . .
Organisms
antrum mucosa: digestive system; gastric mucosa: digestive system
IT Diseases
gastritis: digestive system disease
IT Chemicals & Biochemicals
N-tritiated hydrogen-methyl-N-nitro-N-**nitrosoguanidine**: carcinogen, penetration; glutathione: modulation, mucosal protection
IT Alternate Indexing
Gastritis (MeSH)

L6 ANSWER 3 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI Investigations of S-transnitrosylation reactions between low- and high-molecular-weight S-**nitroso** compounds and their thiols by high-performance liquid chromatography and gas chromatography-mass spectrometry.
AB. . . nitric oxide-related biological activities are regulated in vivo. Mechanisms of S-transnitrosylation reactions are poorly understood and

equilibria constants for physiological S-**nitroso** compounds and thiols are rare. In the present study we investigated S-transnitrosylation reactions of the thiols homocysteine, cysteine, glutathione, N-acetylcysteine, N-acetylpenicillamine, and human plasma albumin and their corresponding S-**nitroso** compounds SNhC, SNC, GSNO, SNAC, SNAP, and SNALB utilizing high-performance liquid chromatographic and gas chromatographic-mass spectrometric techniques. These methods allowed to study S-transnitrosylation reactions in mixtures of several S-**nitroso** compound/**thiol** pairs, to **determine** equilibria constants, and to elucidate the mechanism of S-transnitrosylation reactions. We obtained the following order for the equilibria constants in. . . SNAC > GSNO apprxeq SNALB > SNAP > SNC. Our results suggest that the mechanism of S-transnitrosylation reactions of these S-**nitroso** compounds and their thiols involve heterolytic cleavage of the S-N bond. Incubation of SNC with human red blood cells resulted. . .

IT . . .
Systems of Organisms
red blood cells: blood and lymphatics
IT Chemicals & Biochemicals
amino acids: quantitative analysis; thiols: quantitative analysis; S-**nitroso** compounds: molecular weights, quantitative analysis

L6 ANSWER 4 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI Ratio of S-**nitrosohomocyst**(e)ine to homocyst(e)ine or other **thiols determines** neurotoxicity in rat cerebrocortical cultures.
AB. . . of many proteins can be regulated by S-nitrosylation or reaction of nitric oxide (NO)-related species with cysteine residues to produce S-**nitrosoproteins** (S-**nitrosothiols**). However, S-**nitrosothiols**, such as S-**nitrosocysteine** (SNOC) and S-**nitrosohomocysteine** (SNHC), can also be neurotoxic by generating NO which reacts with endogenous O2- to form peroxynitrite. Additionally, thiols such as. . . acute exposure to micromolar SNHC that is normally neurotoxic. This finding can be best explained by the fact that although S-**nitrosothiols** undergo homolytic cleavage to produce NO and subsequent neurotoxicity, adding thiol stabilizes S-**nitrosothiols**, effectively preventing this cleavage. Thus, the equilibrium between **thiol** and **nitrosothiol determines** outcome in studies of neuronal degeneration.
IT . . .
Systems of Organisms
cerebrocortical cells: nervous system
IT Diseases
neuronal degeneration
IT Chemicals & Biochemicals
homocysteine: neurotoxin; nitric oxide; N-methyl-D-aspartate; S-**nitrosocysteine**: neurotoxin; S-**nitrosohomocysteine**: neurotoxin
RN 454-29-5Q (HOMOCYST(E)INE)
6027-13-0Q (HOMOCYST(E)INE)
51209-75-7 (S-**NITROSOCYSTEINE**)
10102-43-9 (NITRIC OXIDE)
6384-92-5 (N-METHYL-D-ASPARTATE)

L6 ANSWER 5 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI Characterization of cytochrome P450 2E1 activity by the (14C) **nitrosodimethylamine** breath test.
AB The objective of this study was to measure the rate of demethylation of **nitrosodimethylamine** in vivo in the rat and determine its value to assess CYP2E1 activity in intact animals. **Nitrosodimethylamine** labeled with 14C on both methyl groups was administered to rats and exhaled 14CO2 was collected during 2-3 h. The **nitrosodimethylamine**

breath test was increased by inducers of CYP2E1, such as ethanol (+139%) and 4-methylpyrazole (+115%). and decreased by the inhibitor diallyl sulfide (-53%). In addition, the **nitrosodimethylamine** breath test was not changed significantly by inducers specific for other cytochrome P450 such as beta-naphthoflavone, dexamethasone, and phenobarbital. The specificity of the induction by 4-methylpyrazole and of the inhibition by diallyl **sulfide** for CYP2E1 was **determined** using the (14C)caffeine (CYP1A2), (14C)aminopyrine (CYP2C11), and (14C)erythromycin (CYP3A2) breath tests. 4-Methylpyrazole treatment caused a small increase of the caffeine. . . of the aminopyrine breath test (-13%) but a 23% increase of the erythromycin breath test. It is concluded that the (14C)**nitrosodimethylamine** breath test is useful to assess CYP2E1 activity in vivo in the rat.

IT Methods & Equipment

[carbon-13]**nitrosodimethylamine** breath test: analytical method, catalytical activity evaluation method, enzymatic method, physiological method

L6 ANSWER 6 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN

AB While **nitrosothiol** compounds have been hypothesized to be important in the transport and function of nitric oxide (NO) in biological systems many. . . view of these fundamental questions there has been a great need for simple, sensitive, and specific methods for quantitation of **nitrosothiols** in biological samples. We report the development of two methods, for the measurement of **nitrosothiol** compounds using a chemiluminescence nitric oxide analyzer with a standard purging vessel. The first method is based on treatment with. . . iodide in the presence or absence of dissolved free iodine. Quantitative release of NO occurs either from both nitrite and **nitrosothiols** or from nitrite alone, respectively. Subtraction of the amount of NO released without iodine from NO released in the presence of iodine allows estimation of the **nitrosothiol** concentration. To selectively measure **nitrosothiols**, we developed a redox quinone-hydroquinone alkaline reactant that selectively releases NO from **nitrosothiols**. This reactant quantitatively converts **nitrosothiols** to NO at elevated temperature, >60degreeC. Both methods were shown to detect **nitrosothiols** in biological buffers or blood plasma down to 10 nM concentration with high accuracy and reproducibility, variability less than 5%.. . .

IT Major Concepts

Biochemistry and Molecular Biophysics; Methods and Techniques

IT Chemicals & Biochemicals

nitric oxide; nitrite; nitrosylated **thiols**: assay, chemiluminescence **measurement**, quantitation; potassium iodide: Kodak

L6 ANSWER 7 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN

TI Nitric oxide donation and nitrite assays in the presence of **thiols** and albumin as **determined** by Griess' and Werringloer's methods.

AB. . . were used as a source of NO2-. This happened probably because at low Ph of the reaction mixture the corresponding **nitrosothiols** were formed and thus NO2 was not accessible for detection. However, this phenomenon was not seen when instead of SIN-1 another NO donor - S-**nitroso**-N-acetylpenicillamine (SNAP) was used. SNAP is a **nitrosothiol** itself and physiological low molecular thiols (e.g. GSH or cysteine) displaced NO from SNAP. An increase in the amount of. . .

IT . . .

sodium nitrite; thiols: low-molecular weight; D,L-alanine: amino acid; D,L-arginine: amino acid; D,L-serine: amino acid; L-taurine: amino acid; N-acetylcysteine: amino acid; S-**nitroso** -N-acetylpenicillamine: nitric oxide donor; 3-morpholinosydnonimi [SIN-1]: nitric oxide donor

RN 10102-43-9 (NITRIC OXIDE)
14797-65-0 (NITRITE)
33876-97-0 (SIN-1)
7632-00-0 (SODIUM NITRITE)
56-41-7 (L-ALANINE)
616-91-1 (N-ACETYLCYSTEINE)
74-79-3 (L-ARGININE)
56-45-1 (L-SERINE)
79032-48-7 (S-**NITROSO**-N-ACETYLPENICILLAMINE)

L6 ANSWER 8 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI A method to study kinetics of transnitrosation with **nitrosoglutathione**: Reactions with hemoglobin and other thiols.
AB The rate of protein S-nitrosylation, a reversible process by which S-**nitroso** thiol (RS-NO) com. pounds exchange the NO+ moiety with protein SH groups, is essentially governed by two factors, the pKa. . . of thiols. The second order rate constants of S-nitrosylation of human and rat oxy- and deoxyhemoglobin of BSA and other **thiols** were **calculated** by this method which confirmed previous results reported in the literature.
IT Major Concepts
Biochemistry and Molecular Biophysics; Methods and Techniques
IT Chemicals & Biochemicals
hemoglobin: transnitrosation kinetics; **nitrosoglutathione**: nitrosylating agent; proteins: transnitrosation kinetics; thiols: transnitrosation kinetics

L6 ANSWER 9 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI S-transnitrosation reactions involving plasma membrane **thiol** groups are mechanistic **determinants** of the biological effects of S-**nitrosothiols**.
IT . . .
and Circulation)
IT Parts, Structures, & Systems of Organisms
aorta: circulatory system; plasma membrane
IT Chemicals & Biochemicals
cyclic GMP; S-**nitrosothiol**
IT Miscellaneous Descriptors
Meeting Abstract; S-**nitrosothiol**-dependent vasorelaxation; S-transnitrosation reaction

L6 ANSWER 10 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI Balance between **thiol** and S-**nitrosothiol** **determines** neurotoxicity in cortical cultures.
IT Miscellaneous Descriptors
CORTICAL CELL CULTURE; CYSTEINE; HOMOCYSTEINE; MEETING ABSTRACT; MEETING POSTER; NERVOUS SYSTEM; NEURONAL DEGENERATION; NEUROPROTECTIVE EFFECT; S-**NITROSOTHIOL**; THIOL

L6 ANSWER 11 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
AB. . . study investigates the effects of thiol-depleting/modifying agents on the activity of and tolerance to nitroglycerin (GTN), sodium nitroprusside (SNP) and S-**nitroso**-Nacetylpenicillamine (SNAP) in an in vivo rat model. Rats were treated with either vehicle (control), GTN (before and after induction of. . . SNP and SNAP on vascular cyclic GMP levels were investigated before and after each treatment. In addition, plasma and tissue **thiol** concentrations were **measured** in the same tissues as used for the determination of cyclic GMP in aorta and inferior vena cava after single. . . of the enzyme or via an S-enzyme-S-drug transnitrosation reaction, whereas GTN and SNP actions are mediated by the formation of S-**nitrosothiol** on the enzyme itself, rather than by activation of the enzyme by free S-**nitrosothiols**.

L6 ANSWER 12 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
AB. . . This indicates that residues within the active site of the enzyme are positively charged. The pK-a of the active site **thiol** group was **determined** to be 4.67. The low pK-a value suggests that ionic interactions are important in stabilizing the thiolate anion. One candidate. . .
ORGN Super Taxa
Enterobacteriaceae: Eubacteria, Bacteria; Nitrobacteraceae: Eubacteria, Bacteria
ORGN Organism Name
Enterobacteriaceae (Enterobacteriaceae); **Nitrosomonas** (Nitrobacteraceae)
ORGN Organism Superterms
bacteria; eubacteria; microorganisms

L6 ANSWER 13 OF 13 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC. on STN
TI DIFFERENTIAL EFFECTS OF THIOLS ON DNA MODIFICATIONS VIA ALKYLATION AND MICHAEL ADDITION BY ALPHA ACETOXY-N-**NITROSOPYRROLIDINE**.
AB. . . formation of adduct 2, although both adducts are presumably derived from the 4-oxobutylating agent. The reaction rates of thiols with **crotonaldehyde** were determined to **be** in following order: means > Glu > Nac. These results indicate that the differential effects of thiols on DNA modification. . .

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FULL ESTIMATED COST	86.78	86.99

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FILE COVERS 1907 - 11 Oct 2003 VOL 139 ISS 16
FILE LAST UPDATED: 10 Oct 2003 (20031010/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> s l1 and (pyridylazo or nitrosoaminophenol or nitroso?)
288676 SULFIDE
80379 SULFIDES
319078 SULFIDE
(SULFIDE OR SULFIDES)
45627 THIOL
31182 THIOLS
63319 THIOL
(THIOL OR THIOLS)

```
        314681 SULFUR
           467 SULFURS
        314900 SULFUR
                 (SULFUR OR SULFURS)
        749297 DETERMIN?
        547800 DET
         33690 DETS
        578865 DET
                 (DET OR DETS)
       1853273 DETD
        300974 DETG
       1424104 DETN
        127204 DETNS
       1498281 DETN
                 (DETN OR DETNS)
       3691412 DETERMIN?
                 (DETERMIN? OR DET OR DETD OR DETG OR DETN)
        103191 QUANTIF?
        159753 CALCULAT?
        120595 CALC
          5801 CALCS
        125820 CALC
                 (CALC OR CALCS)
        796059 CALCD
            11 CALCDS
        796065 CALCD
                 (CALCD OR CALCDS)
         79289 CALCG
             1 CALCGS
         79289 CALCG
                 (CALCG OR CALCGS)
        403290 CALCN
        432013 CALCNS
        735245 CALCN
                 (CALCN OR CALCNS)
       1487568 CALCULAT?
                 (CALCULAT? OR CALC OR CALCD OR CALCG OR CALCN)
       2332536 MEASURE?
         27178 (SULFIDE OR THIOL OR SULFUR) (3W) (DETERMIN? OR QUANTIF? OR
               CALCULAT? OR MEASURE?)
          4019 PYRIDYLAZO
             1 PYRIDYLAZOS
          4019 PYRIDYLAZO
                 (PYRIDYLAZO OR PYRIDYLAZOS)
            10 NITROSOAMINOPHENOL
             1 NITROSOAMINOPHENOLS
            10 NITROSOAMINOPHENOL
                 (NITROSOAMINOPHENOL OR NITROSOAMINOPHENOLS)
         55417 NITROSO?
L7          84 L1 AND (PYRIDYLAZO OR NITROSOAMINOPHENOL OR NITROSO?)

=> s l7 and (enzyme or enzymatic or lyase)
        686710 ENZYME
        395722 ENZYMES
        864120 ENZYME
                 (ENZYME OR ENZYMES)
          8178 ENZYMATIC
             1 ENZYMATICS
          8179 ENZYMATIC
                 (ENZYMATIC OR ENZYMATICS)
         14547 LYASE
          2286 LYASES
         15556 LYASE
```

(LYASE OR LYASES)
L8 2 L7 AND (ENZYME OR ENZYMATIC OR LYASE)

=> d l8 kwic 1-2

L8 ANSWER 1 OF 2 CAPLUS COPYRIGHT 2003 ACS on STN
AB . . . study investigates the effects of thiol-depleting/modifying agents on the activity of and tolerance of nitroglycerin (GTN), sodium nitroprusside (SNP) and S-**nitroso**-N-acetylpenicillamine (SNAP) in an in vivo rat model. Rats were treated with either vehicle (control), GTN (before and after induction of. . . GTN, SNP and SNAP on vascular cGMP levels were investigated before and after each treatment. In addn., plasma and tissue **thiol** concns. were **measured** in the same tissues as used for the detn. of cGMP in aorta and inferior vena cava after single and. . . action and tolerance. Here we propose that SNAP may act either directly by nitrosation of the heme moiety of the **enzyme** or via an S-**enzyme**-S-drug transnitrosation reaction, whereas GTN and SNP actions are mediated by the formation of S-**nitrosothiol** on the **enzyme** itself, rather than by activation of the **enzyme** by free S-**nitrosothiols**.
IT 79032-48-7, S-**Nitroso**-N-acetylpenicillamine
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(effects of thiol-depleting/modifying agents on the activity of and tolerance of nitroglycerin , sodium nitroprusside and S-**nitroso** -N-acetylpenicillamine)

L8 ANSWER 2 OF 2 CAPLUS COPYRIGHT 2003 ACS on STN
TI Differential effects of thiols on DNA modifications via alkylation and Michael addition by .alpha.-acetoxy-N-**nitrosopyrrolidine**
AB The hepatocarcinogen N-**nitrosopyrrolidine** (NPYR) is metabolically activated by .alpha.-hydroxylation mediated by cytochrome P 450 **enzymes** to yield a 4-oxobutylating agent and 2-butenal (crotonaldehyde). Both are reactive intermediates capable of modifying DNA with guanine either by. . . inhibit the formation of adduct 2, although both adducts are presumably derived from the 4-oxobutylating agent. The reaction rates of **thiols** with crotonaldehyde were **detd.** to be in the following order: mesna > Glu > Nac. These results indicate that the differential effects of thiols. . .

=> s l7 and (homocysteine)
8062 HOMOCYSTEINE
50 HOMOCYSTEINES
8078 HOMOCYSTEINE
(HOMOCYSTEINE OR HOMOCYSTEINES)
L9 7 L7 AND (HOMOCYSTEINE)

=> d l9 kwic 1-7

L9 ANSWER 1 OF 7 CAPLUS COPYRIGHT 2003 ACS on STN
TI Plasma cysteine deficiency and decreased reduction of **nitrososulfamethoxazole** with HIV infection
AB . . . deficiency and whether this is assocd. with decreased detoxification of the toxic metabolites of sulfamethoxazole. Reduced, oxidized, protein-bound, and total **thiol** levels were **measured** in 33 HIV-pos. patients and 33 control subjects by an HPLC method utilizing the fluorescent probe bromobimane. The redn. of sulfamethoxazole hydroxylamine and **nitrososulfamethoxazole** by plasma and the plasma redox balance in the presence of **nitrososulfamethoxazole** were also detd. by HPLC. Reduced plasma cysteine was significantly ($p < 0.0001$) lower in HIV-pos. patients (13.0

.+-. 3.0. . . Although there was no difference in oxidized, protein-bound, and total cysteine, the thiol/disulfide ratios were lower in HIV-pos. patients. Reduced **homocysteine** was elevated in patients. Plasma from HIV-pos. patients was less able to detoxify **nitrososulfamethoxazole** than control plasma. These findings show that the disturbance in redox balance in HIV-pos. patients may alter metabolic detoxification capacity,. . .

ST **nitrososulfamethoxazole** redn HIV infection blood cysteine deficiency; sulfamethoxazole hypersensitivity AIDS plasma cysteine deficiency

IT Thiols (organic), biological studies
RL: BOC (Biological occurrence); BPR (Biological process); BSU (Biological study, unclassified); BIOL (Biological study); OCCU (Occurrence); PROC (Process)
(-disulfides ratio; plasma cysteine deficiency and decreased redn. of **nitrososulfamethoxazole** with HIV infection)

IT Disulfides
RL: BOC (Biological occurrence); BPR (Biological process); BSU (Biological study, unclassified); BIOL (Biological study); OCCU (Occurrence); PROC (Process)
(-thiols ratio; plasma cysteine deficiency and decreased redn. of **nitrososulfamethoxazole** with HIV infection)

IT Proteins, general, biological studies
RL: BPR (Biological process); BSU (Biological study, unclassified); BIOL (Biological study); PROC (Process)
(blood; plasma cysteine deficiency and decreased redn. of **nitrososulfamethoxazole** with HIV infection)

IT AIDS (disease)
Human immunodeficiency virus 1
(plasma cysteine deficiency and decreased redn. of **nitrososulfamethoxazole** with HIV infection)

IT 114438-33-4, Sulfamethoxazole hydroxylamine 131549-85-4
RL: ADV (Adverse effect, including toxicity); BPR (Biological process); BSU (Biological study, unclassified); MFM (Metabolic formation); BIOL (Biological study); FORM (Formation, nonpreparative); PROC (Process)
(plasma cysteine deficiency and decreased redn. of **nitrososulfamethoxazole** with HIV infection)

IT 723-46-6, Sulfamethoxazole
RL: ADV (Adverse effect, including toxicity); BPR (Biological process); BSU (Biological study, unclassified); THU (Therapeutic use); BIOL (Biological study); PROC (Process); USES (Uses)
(plasma cysteine deficiency and decreased redn. of **nitrososulfamethoxazole** with HIV infection)

IT 52-90-4, Cysteine, biological studies 6027-13-0, **Homocysteine**
RL: BOC (Biological occurrence); BPR (Biological process); BSU (Biological study, unclassified); BIOL (Biological study); OCCU (Occurrence); PROC (Process)
(plasma cysteine deficiency and decreased redn. of **nitrososulfamethoxazole** with HIV infection)

L9 ANSWER 2 OF 7 CAPLUS COPYRIGHT 2003 ACS on STN

AB . . . embodiments the chromophore is detectable with the naked eye. In another aspect of preferred embodiments the thiol-specific reagent comprises a **nitroso**-donor, and more preferably Na-nitroprusside. In yet another aspect of preferred embodiments, the solvent insol. compd. comprises a basic or acidic. . . Al-hydroxide. These compns. and methods are more sensitive and reliable method than that previously available, esp. for the detn. of **homocysteine**.

ST **thiol detn** reagent; disulfide detn reagent

IT Chromophores
(reagents for **thiols** and disulfides **detn**. by formation of colored solid state complex)

IT Disulfides

Thiols (organic), analysis
RL: ANT (Analyte); ANST (Analytical study)
(reagents for **thiols** and disulfides **detn**. by formation of colored solid state complex)

IT Reagents
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(reagents for **thiols** and disulfides **detn**. by formation of colored solid state complex)

IT 7732-18-5, Water, analysis
RL: AMX (Analytical matrix); ANST (Analytical study)
(reagents for **thiols** and disulfides **detn**. by formation of colored solid state complex)

IT 454-29-5, **Homocysteine** 462-10-2, Homocystine 923-32-0, Cystine 3374-22-9, Cysteine
RL: ANT (Analyte); ANST (Analytical study)
(reagents for **thiols** and disulfides **detn**. by formation of colored solid state complex)

IT 68-04-2, Trisodium citrate 139-12-8, Aluminum acetate 557-34-6, Zinc acetate 1310-73-2, Sodium hydroxide (NaOH), uses 5961-85-3, Tris(2-carboxyethyl)phosphine 7631-86-9, Silica, uses 7786-81-4, Nickel sulfate (NiSO4) 10108-64-2, Cadmium chloride (CdCl2) 12054-48-7, Nickel hydroxide 14402-89-2, Sodium nitroprusside 20427-58-1, Zinc hydroxide 21645-51-2, Aluminum hydroxide, uses
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(reagents for **thiols** and disulfides **detn**. by formation of colored solid state complex)

IT 60-00-4, EDTA, analysis
RL: ARU (Analytical role, unclassified); ANST (Analytical study)
(reagents for **thiols** and disulfides **detn**. by formation of colored solid state complex)

L9 ANSWER 3 OF 7 CAPLUS COPYRIGHT 2003 ACS on STN

TI Investigations of S-Transnitrosylation Reactions between Low- and High-Molecular-Weight S-**Nitroso** Compounds and Their Thiols by High-Performance Liquid Chromatography and Gas Chromatography-Mass Spectrometry

AB . . . nitric oxide-related biol. activities are regulated in vivo. Mechanisms of S-transnitrosylation reactions are poorly understood and equil. consts. for physiol. S-**nitroso** compds. and thiols are rare. In the present study we investigated S-transnitrosylation reactions of the thiols **homocysteine**, cysteine, glutathione, N-acetylcysteine, N-acetylpenicillamine, and human plasma albumin and their corresponding S-**nitroso** compds. SNhC, SNC, GSNO, SNAC, SNAP, and SNALB utilizing high-performance liq. chromatog. and gas chromatog.-mass spectrometric techniques. These methods allowed to study S-transnitrosylation reactions in mixts. of several S-**nitroso** compd./**thiol** pairs, to **det**. equil. consts., and to elucidate the mechanism of S-transnitrosylation reactions. We obtained the following order for the equil. consts. in. . . SNAC > GSNO .apprxeq. SNALB > SNAP > SNC. Our results suggest that the mechanism of S-transnitrosylation reactions of these S-**nitroso** compds. and their thiols involve heterolytic cleavage of the S-N bond. Incubation of SNC with human red blood cells resulted. . .

IT Equilibrium constant
Erythrocyte
HPLC
Nitrosation
(S-transnitrosylation reactions between low- and high-mol.-wt. S-**nitroso** compds. and thiols by high-performance liq. chromatog. and gas chromatog.-mass spectrometry)

IT **Nitroso** compounds
RL: ANT (Analyte); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation)

(S-transnitrosylation reactions between low- and high-mol.-wt. S-**nitroso** compds. and thiols by high-performance liq. chromatog. and gas chromatog.-mass spectrometry)

IT Thiols (organic), reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(S-transnitrosylation reactions between low- and high-mol.-wt. S-**nitroso** compds. and thiols by high-performance liq. chromatog. and gas chromatog.-mass spectrometry)

IT Mass spectrometry
Mass spectrometry
(gas chromatog. combined with; S-transnitrosylation reactions between low- and high-mol.-wt. S-**nitroso** compds. and thiols by high-performance liq. chromatog. and gas chromatog.-mass spectrometry)

IT Gas chromatography
Gas chromatography
(mass spectrometry combined with; S-transnitrosylation reactions between low- and high-mol.-wt. S-**nitroso** compds. and thiols by high-performance liq. chromatog. and gas chromatog.-mass spectrometry)

IT Albumins, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(serum; S-transnitrosylation reactions between low- and high-mol.-wt. S-**nitroso** compds. and thiols by high-performance liq. chromatog. and gas chromatog.-mass spectrometry)

IT 52-90-4, L-Cysteine, reactions 70-18-8, Glutathione, reactions
616-91-1, N-Acetylcysteine 6027-13-0, L-**Homocysteine**
14797-55-8, Nitrate, reactions 14797-65-0, Nitrite, reactions
15537-71-0, N-Acetylpenicillamine
RL: RCT (Reactant); RACT (Reactant or reagent)
(S-transnitrosylation reactions between low- and high-mol.-wt. S-**nitroso** compds. and thiols by high-performance liq. chromatog. and gas chromatog.-mass spectrometry)

L9 ANSWER 4 OF 7 CAPLUS COPYRIGHT 2003 ACS on STN

TI Ratio of S-**nitrosohomocyst**(e)ine to homocyst(e)ine or other **thiols determines** neurotoxicity in rat cerebrocortical cultures

AB . . . of many proteins can be regulated by S-nitrosylation or reaction of nitric oxide (NO)-related species with cysteine residues to produce S-**nitrosoproteins** (S-**nitrosothiols**). However, S-**nitrosothiols**, such as S-**nitrosocysteine** (SNOC) and S-**nitrosohomocysteine** (SNHC), can also be neurotoxic by generating NO which reacts with endogenous O2- to form peroxynitrite. Addnl., thiols such as cysteine and **homocysteine** can be neurotoxic by acting as N-methyl-D-aspartate (NMDA) agonists. Paradoxically, we show here that millimolar thiol can protect from acute exposure to micromolar SNHC that is normally neurotoxic. This finding can be best explained by the fact that although S-**nitrosothiols** undergo homolytic cleavage to produce NO and subsequent neurotoxicity, adding thiol stabilizes S-**nitrosothiols**, effectively preventing this cleavage. Thus, the equil. between **thiol** and **nitrosothiol dets.** outcome in studies of neuronal degeneration.

ST cerebrocortical neurotoxicity **nitrosothiol homocysteine** NMDA receptor; nitric oxide thiol **nitrosothiol** neurodegeneration

IT Glutamate receptors
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(NMDA-binding; effects of thiols on S-**nitrosohomocysteine** neurotoxicity in cerebrocortical cultures)

IT Neurotransmitter agonists
(NMDA; effects of thiols on S-**nitrosohomocysteine** neurotoxicity in cerebrocortical cultures)

IT Brain
(cerebral cortex; effects of thiols on S-**nitrosohomocysteine**

neurotoxicity in cerebrocortical cultures)

IT Nerve
(degeneration; effects of thiols on S-**nitrosohomocysteine** neurotoxicity in cerebrocortical cultures)

IT Thiols (organic), biological studies
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); BIOL (Biological study)
(effects of thiols on S-**nitrosohomocysteine** neurotoxicity in cerebrocortical cultures)

IT Toxicity
(neurotoxicity; effects of thiols on S-**nitrosohomocysteine** neurotoxicity in cerebrocortical cultures)

IT 139427-42-2, S-**Nitrosohomocysteine**
RL: ADV (Adverse effect, including toxicity); BIOL (Biological study)
(effects of thiols on S-**nitrosohomocysteine** neurotoxicity in cerebrocortical cultures)

IT 52-90-4, Cysteine, biological studies 70-18-8, Glutathione, biological studies 616-91-1, N-Acetylcysteine 6027-13-0, **Homocysteine**
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); BIOL (Biological study)
(effects of thiols on S-**nitrosohomocysteine** neurotoxicity in cerebrocortical cultures)

IT 10102-43-9, Nitric oxide, biological studies 11062-77-4, Superoxide 19059-14-4, Peroxynitrite
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(effects of thiols on S-**nitrosohomocysteine** neurotoxicity in cerebrocortical cultures)

L9 ANSWER 5 OF 7 CAPLUS COPYRIGHT 2003 ACS on STN

AB With a view to using total **homocysteine** (HCys) as a CV* disease marker, a method has been developed for detg. its level in plasma, entailing derivatization and. . . a CZE-UV method has been devised to assay plasma for NO adducts and also nitrite and nitrate. Failure to find S-**nitrosothiols** in biosamples, even after concn. by freeze-drying, is attributed to insufficient sensitivity of the present method.

IT **Thiols** (organic), analysis
RL: ANT (Analyte); ANST (Analytical study)
(**measurement** of markers relating to thiols and nitric oxide in biofluids by HPLC and CE)

IT 6027-13-0, **Homocysteine** 10102-43-9, Nitric oxide, analysis 14797-55-8, Nitrate, analysis 14797-65-0, Nitrite, analysis
RL: ANT (Analyte); ANST (Analytical study)
(measurement of markers relating to thiols and nitric oxide in biofluids by HPLC and CE)

L9 ANSWER 6 OF 7 CAPLUS COPYRIGHT 2003 ACS on STN

ST blood nitrosylHb detn photolysis chemiluminescence disease; **nitroso thiol detn** photolysis chemiluminescence

IT Hemoglobins
Thiols (organic), analysis
RL: ANT (Analyte); THU (Therapeutic use); ANST (Analytical study); BIOL (Biological study); USES (Uses)
(S-**nitroso**; nitrosyl [Fe(II)]-Hb detn. by photolysis/chemiluminescence in relation to nitric oxide metab.)

IT Albumins, analysis
RL: ANT (Analyte); ANST (Analytical study)
(serum, S-**nitroso**; nitrosyl [Fe(II)]-Hb detn. by photolysis/chemiluminescence in relation to nitric oxide metab.)

IT Proteins, specific or class
RL: ANT (Analyte); THU (Therapeutic use); ANST (Analytical study); BIOL (Biological study); USES (Uses)

(sulfoproteins, S-**nitroso**; nitrosyl [Fe(II)]-Hb detn. by photolysis/chemiluminescence in relation to nitric oxide metab.)

IT 6027-13-0, **Homocysteine**
RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)
(metabolic disorders, hyperhomocysteinemia; nitrosyl [Fe(II)]-Hb detn. by photolysis/chemiluminescence in relation to nitric oxide metab.)

IT 51209-75-7, S-**Nitroso**-L-cysteine 56577-02-7, S-**Nitroso**-N-acetyl-L-cysteine 57564-91-7, S-**Nitrosoglutathione**
RL: ANT (Analyte); ANST (Analytical study)
(nitrosyl [Fe(II)]-Hb detn. by photolysis/chemiluminescence in relation to nitric oxide metab.)

L9 ANSWER 7 OF 7 CAPLUS COPYRIGHT 2003 ACS on STN

AB A general assay procedure for a wide variety of thiols is described. The technique has three steps: (1) formation of S-**nitrosothiols** with nitrous acid, (2) destruction of the excess of nitrous acid, (3) hydrolysis of the S-**nitrosothiols** with mercuric ions and subsequent formation of an azo dye by means of the nitrous acid liberated. Both manual and. . .

ST **thiol detn** nitrosation spectrophotometry; flow injection spectrophotometry **thiol detn**; mercapto group detn peptide protein; peptide analysis thiol group; protein analysis thiol group; nitrous acid reagent **thiol detn**

IT **Thiols**, analysis
RL: ANT (Analyte); ANST (Analytical study)
(**detn**. of, by manual and flow-injection spectrophotometry)

IT Albumins, analysis
Peptides, analysis
Proteins, analysis
RL: ANST (Analytical study)
(**thiol**-group **detn**. in, by flow-injection spectrophotometry)

IT 52-67-5, Penicillamine 52-90-4, Cysteine, analysis 60-24-2 68-11-1, analysis 70-18-8, Glutathione, analysis 70-49-5, Mercaptosuccinic acid 79-42-5, 2-Mercaptopropionic acid 100-53-8, Toluene-.alpha.-**thiol** 106-45-6, 4-Toluenethiol 107-96-0, 3-Mercaptopropionic acid 108-98-5, Benzenethiol, analysis 156-57-0, 2-Mercaptoethylammonium chloride 1942-52-5 6027-13-0, **Homocysteine**
RL: ANT (Analyte); ANST (Analytical study)
(**detn**. of, by manual and flow-injection spectrophotometry)

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L9 ANSWER 2 OF 7 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2000:589948 CAPLUS
DOCUMENT NUMBER: 133:159498
TITLE: Compounds and methods for determination of thiols
INVENTOR(S): Dabovic, Milan
PATENT ASSIGNEE(S): MetaQuant Trust, USA
SOURCE: U.S., 9 pp.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
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PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 6107100	A	20000822	US 1998-79436	19980515
PRIORITY APPLN. INFO.:			YU 1998-196 A	19980430

ABSTRACT:
Compns. and methods are provided for detg. thiols or disulfides in which a sulfur contg. analyte is combined with a thiol-specific reagent to produce an intermediate, and the intermediate is combined with a solvent insol. compd. to produce a solid state complex. In one aspect of preferred embodiments the intermediate comprises a chromophore, and in esp. preferred embodiments the chromophore is detectable with the naked eye. In another aspect of preferred embodiments the thiol-specific reagent comprises a **nitroso**-donor, and more preferably Na-nitroprusside. In yet another aspect of preferred embodiments, the solvent insol. compd. comprises a basic or acidic metallic compd., or a polymeric matrix. Still more preferred solvent insol. compds. comprise Zn-hydroxide, Ni-hydroxide or Al-hydroxide. These compns. and methods are more sensitive and reliable method than that previously available, esp. for the detn. of **homocysteine**.

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

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